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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/724,488	11/28/2000	Todd H. Mansfield	2204/B02	6984
2101	7590	05/13/2004	EXAMINER PHAN, MAN U	
BROMBERG & SUNSTEIN LLP 125 SUMMER STREET BOSTON, MA 02110-1618			ART UNIT 2665	PAPER NUMBER

DATE MAILED: 05/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/724,488

Applicant(s)

MANSFIELD ET AL.

Examiner

Man Phan

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9 and 11 is/are rejected.
- 7) ☒ Claim(s) 8,10 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. The application of Manfield et al. for a "Prioritized continuous deficit round robin scheduling" filed 11/28/2000 has been examined. Claims 1-12 are pending in the application.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7 and 9, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalkunte et al. (US#6,470,016) in view of Wilford et al. (US#6,687,247).

With respect to claims 9 and 11, both Kalkunte et al. (US#6,470,016 and Wilford et al. (US#6,687,247) disclose a novel method and system for fairly scheduling access to a shared resource by a plurality of sources, according to the essential features of the claims. Kalkunte discloses an adaptive weighted round robin scheduling apparatus and method schedules variable-length frame transmissions from a plurality of output queue having different transmission priorities by first allocating, for each queue, a number of bandwidth segments for a bandwidth

cycle and a number of transmission opportunities for a round robin cycle, and then processing the queues consecutively in a round-robin fashion, beginning with a highest priority queue, until none of the queues has any bandwidth remaining. More specifically, during each iteration of a round robin cycle, a queue is permitted to transmit a frame if the queue has at least one remaining transmission opportunity, the queue has a frame ready for transmission, and the queue has at least one remaining bandwidth segment, and furthermore the number of transmission opportunities for the queue is decremented by at least one. Upon transmitting a frame, the number of bandwidth segments for the queue is decreased by the number of bandwidth segments in the frame. If a queue has no frame ready for transmission, then the queue may be either penalized, in which case the number of bandwidth segments for the queue is reduced, or forced to forfeit its bandwidth segments, in which case any remaining bandwidth segments are reallocated to other queues and the number of bandwidth segments and the number of transmission opportunities for the queue are set to zero (See Fig. 2; Col. 1, lines 60 plus; and Col. 16, lines 44 plus).

However, Kalkunte does not disclose expressly the type of data forwarded from the plurality of sources, and independent of a size of data stored by each of the sources. In the same field of endeavor, Wilford et al.(US#6,687,247) discloses in Fig. 18 a block diagram illustrated a high level view of the ordering by which the Modified Decifit Round Robin (MDRR) algorithm selects output queues on the Memory Controller (MCC), in which the MCC Output Processing (*Dequeue packets*) need to fulfill several requirements: a) Execute Modified Deficit Round Robin Algorithm on 2064 output queues for the MCC or 136 queues for the TX; b) Maintain  $\geq 10$  Gb/s output to FIA192 regardless of packet or queue sizes (*independent of a size of data*

*stored by each of the source*); c) Maintain >wire rate output speed to each TX PLIM port; d) Interleave small quanta (*amount of credit*) of output data for logically separate streams of packets referred to here as "channels": 34 channels to the FIA192 (*2 priority levels of unicast traffic for 16 slots plus 2 priority levels of multicast traffic*) and 2 channels for high and low priority CPU data. Or 16 channels in the TX for transmit side PLIM ports plus 1 channel for transmit side CPU data; e) Respond to back pressure signals for those output channels; f) Support per queue back pressure; g) Support per queue rate limiting in the TX. The MDRR algorithm is based on the well known DRR algorithm but with one of each set of eight queues considered a high priority queue (Col. 33; lines 21 plus).

Regarding claims 1-7, they are method claims corresponding to the apparatus claims 9 and 11 above. Therefore, claims 1-7 are analyzed and rejected as previously discussed with respect to claims 9 and 11.

One skilled in the art would have recognized the need for effectively and efficiently scheduling data packet transmissions during the queue selection utilizing priorities in the forwarded packets communication, and would have applied Wilford's teaching of the process by which the MDRR algorithm selects output queues into Kalkunte's novel use of the adaptive weighted round robin scheduling technique. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Wilford's architecture for high speed class of service enabled linecard into Kalkunte's servicing output queues dynamically according bandwidth allocation in a frame environment with the motivation being to provide a method and system for managing packets within a network.

*Allowable Subject Matter*

4. Claims 8, 10 and 12 are objected to as being dependent upon the rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

5. The following is an examiner's statement of reasons for the indication of allowable subject matter: The closest prior art of record fails to disclose or suggest wherein the step of selecting further comprises: examining the indicators of each of the plurality of sources in the order to determine a next source having an indicator set to indicate presence of data at the source; adding the weight associated with the next source to a balance; forwarding a data item from the next source to the shared resource until data items of the data have been forwarded; and in responsive to the balance being greater than zero, and the indicator indicating the presence of data at the source, decrementing the balance for each data item that is forwarded from the next source to the shared resource, and repeating steps forwarding, decrementing until the balance is less than or equal zero, as specifically recited in claims.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Ohba (US#6,101,193) is cited to show the packet scheduling scheme for improving short time fairness characteristic in weighted fair queueing.

The Shimojo (US#6,490,248) is cited to show the packet transfer device and packet transfer method adaptive to a large number of input ports.

The Afek et al. (US#5,956,340) is cited to show the space efficient fair queuing by stochastic memory multiplexing.

The Fawaz et al. (US#6,714,517) is cited to show the method and apparatus for interconnection of packet switches with guaranteed bandwidth.

The Yang et al. (US#5,905,730) is cited to show the high speed packet scheduling method and apparatus.

The Hughes et al. (US#6,526,060) is cited to show the dynamic rate based, weighted fair scheduler with explicit rate feedback option.

The Srinivasan (US#5,991,812) is cited to show the methods and apparatus for fair queuing over a network.

The Howard (US#6,683,884) is cited to show the shared credit round robin queuing.

The Kalkunte et al. (US#6,567,417) is cited to show the frame forwarding in a switch fabric.

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (703)305-1029.

The examiner can normally be reached on Mon - Fri from 6:30 to 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (703) 308-6602. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3988.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

**9. Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

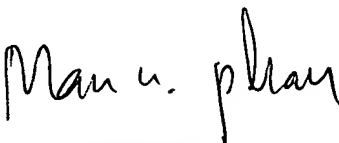
**or faxed to:** (703) 305-9051, (for formal communications intended for entry)

**Or:** (703) 305-3988 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Mphan

05/11/2004.



**MAN PHAN**  
**PATENT EXAMINER**